

***GEOSPATIAL TECHNOLOGY
APPLICATIONS
at
UNITED TRIBES TECHNICAL COLLEGE***



Mike Collins


Tribal Environmental Science Instructor

NDGIS Users Meeting

Bismarck

September 13, 2007

Outline

- 
- Background
 - Tribal Environmental Science
 - Integrated Geospatial Technology
 - NativeView

UTTC - Background



Tribal Environmental Science



- Associate Degree – 73 semester credit hrs., including 8 hrs. research
- Introductory GIS/GPS/RS course (GEO 125)
- DOD Equipment Grant - 2006
- Another submitted - 2007

Scope



- The initial Phase consists of an Introductory course offered as a General Education 3 credit hour science elective every semester.
- Two other degree programs (CIT and Community Health) in addition to TES, require it .
- An intermediate course concentrating on applications is being developed.
- Summer internships employing GIS/GPS/RS are offered

Resources



- Teaching lab – 28 workstations
- Gis Research Lab – 4 workstations, large format scanner/plotter (HP 820)
- GIS/GPS – 15 Trimble Recon units
- Software – ESRI ArcGIS 9.2 site license
- Data – imported and gathered through research
- People – 2 Instructors, 3 IT support staff, and 20+ students
- Methods – FGDC and NDSI as well as international (ISO) standards and ESRI on-line courses
- Migrate to asynchronous distance learning environment

UTTC Track Record



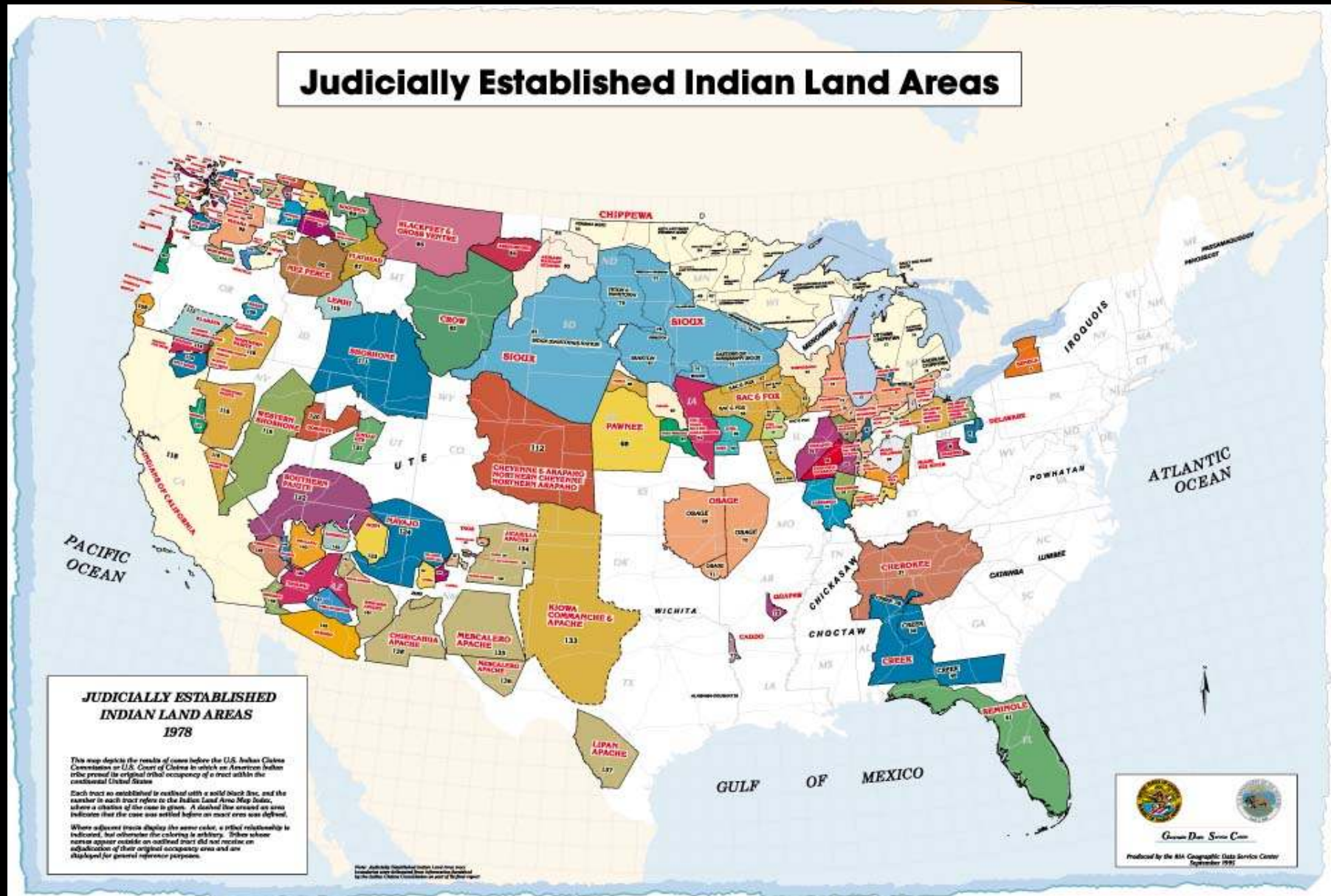
- Course taught 6 times to 42 students
- Offered over IVN twice to 4 other tribal colleges (12 students)
- Second Instructor with GIS experience just hired
- Three workshops offered (32 participants)
- Three summer science camps 3rd – 7th graders (78 future scientists)

GIS In Indian Country – not new

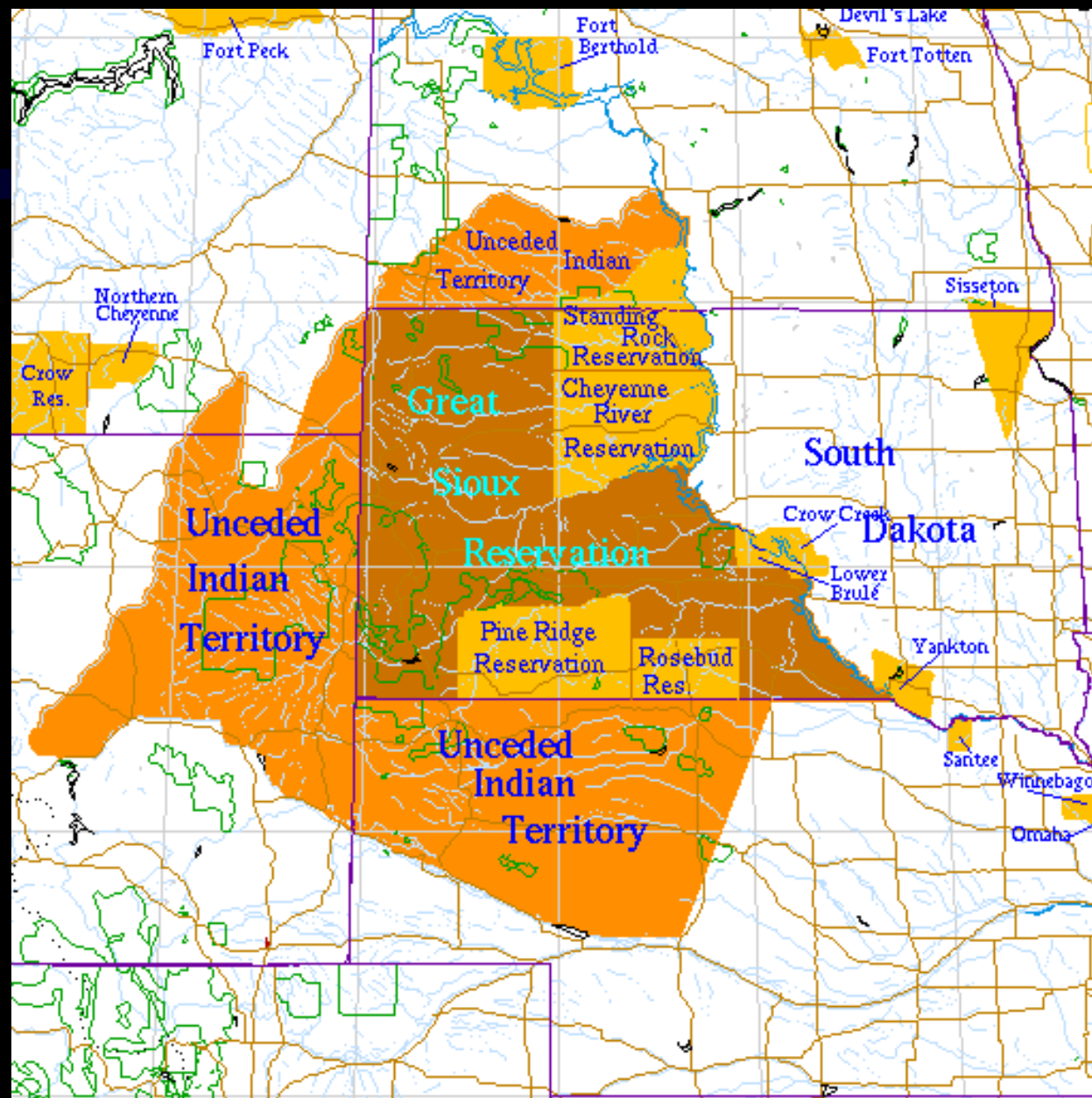


Looking for the next campsite.
(a GIS application circa 1870)

Adjudicated Land Areas In Reference to Law

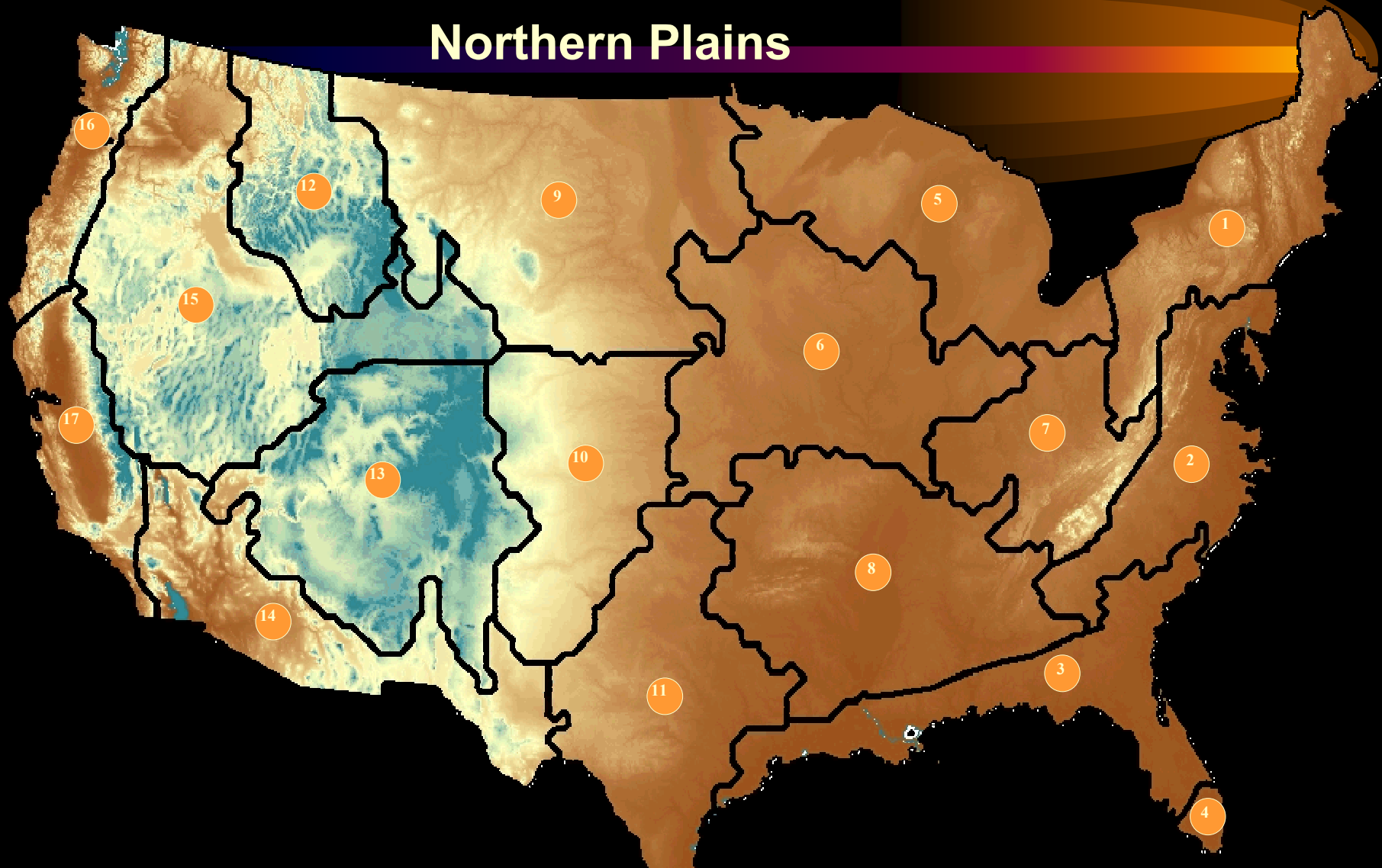


Arbitrated Lakota Aboriginal Lands



NEON Climate Domains

Northern Plains



Tribal GIS Implementation



- Utilization of the GIS tool and continuity of a GIS program by a tribe requires:
 - a) interest
 - b) acceptance
 - c) commitment
 - d) awareness & education



Tribal Uses of GIS

- Natural Resource Management
- Infrastructure Management
- Economic Development
- Environmental Monitoring
- Community Planning and Infrastructure

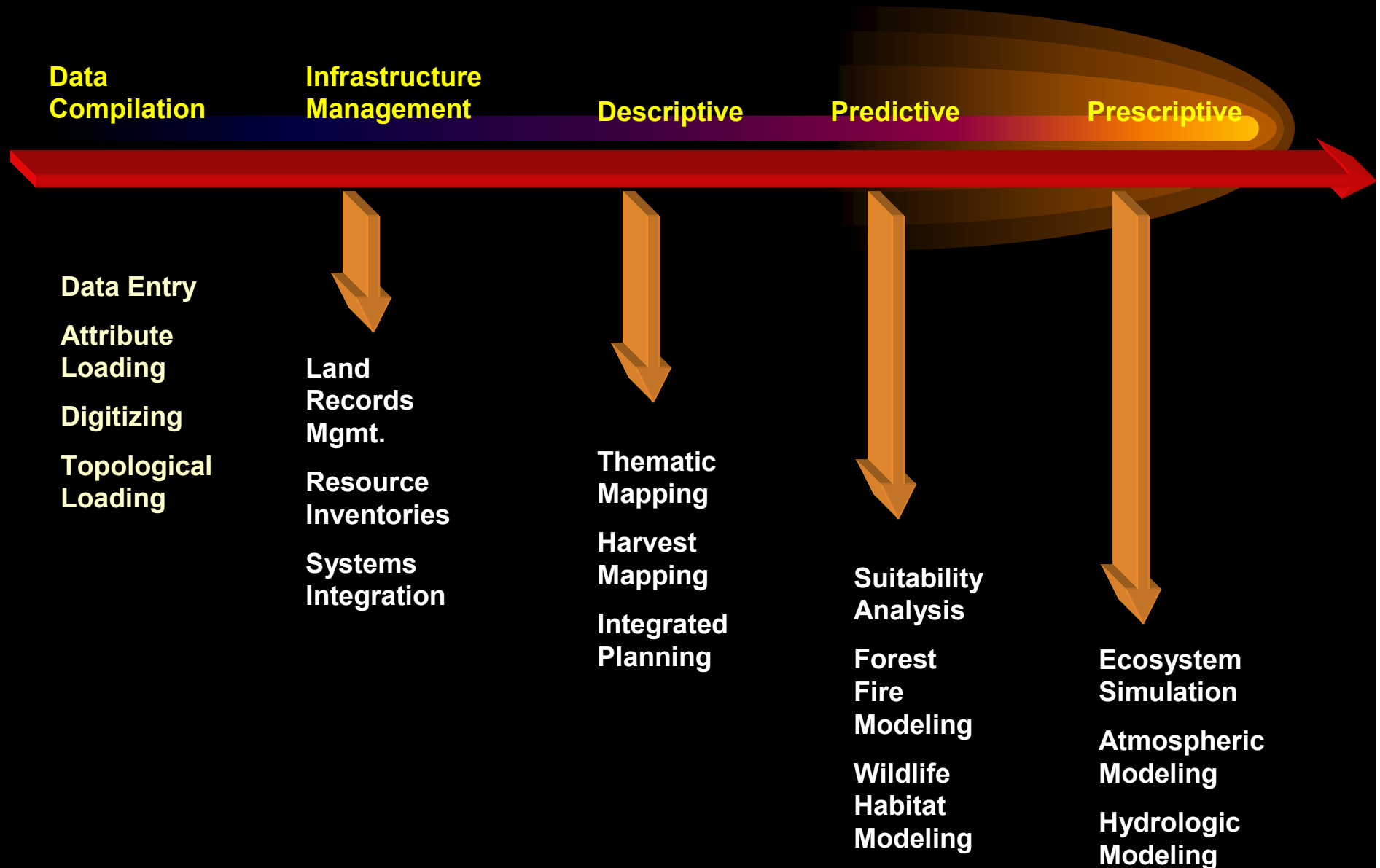


Tribal Uses of GIS – cont.

- Integration of Traditional Ecological Knowledge and Integrated Resource Management Plan.
- Cultural Resource Management
- Treaty and Land Negotiations



The GIS Application Continuum



Education based on Needs



- Present Needs
 - Technical Infrastructure
 - Support Staff
 - Teacher/students
 - Education Standards
- Future Needs
 - Graduate studies/ research
 - Workforce Development
 - Entrepreneurship

Spatial Reasoning: a concept for today's education/ information age.

- Reality: Visualizing the Landscape
 - Local
 - Regional
 - National
 - Global
- “Think globally;
Act locally”



EXAMPLES



- Northwest
Coer d'Alene
- First Peoples of Canada
Ktunaxa
Gitxsan
Squamish
- Southwest
Jemez

Washington



Sandpoint
Hwy. 2
Lake Pend Oreille

The Coeur d'Alene Tribe's
Aboriginal Territory spans
more than 5 million acres
of today's Washington,
Idaho & Montana.

Spokane

I 90

Coeur
d'Alene

Lake
Coeur
d'Alene

Cataldo

Kellogg

Thompson
Falls

Montana

I 90

Cheney

Plummer

St. Maries

St. Regis

LEGEND

Lakes

Rivers

Aboriginal Territory

1873 Res. Boundry

Present Reservation

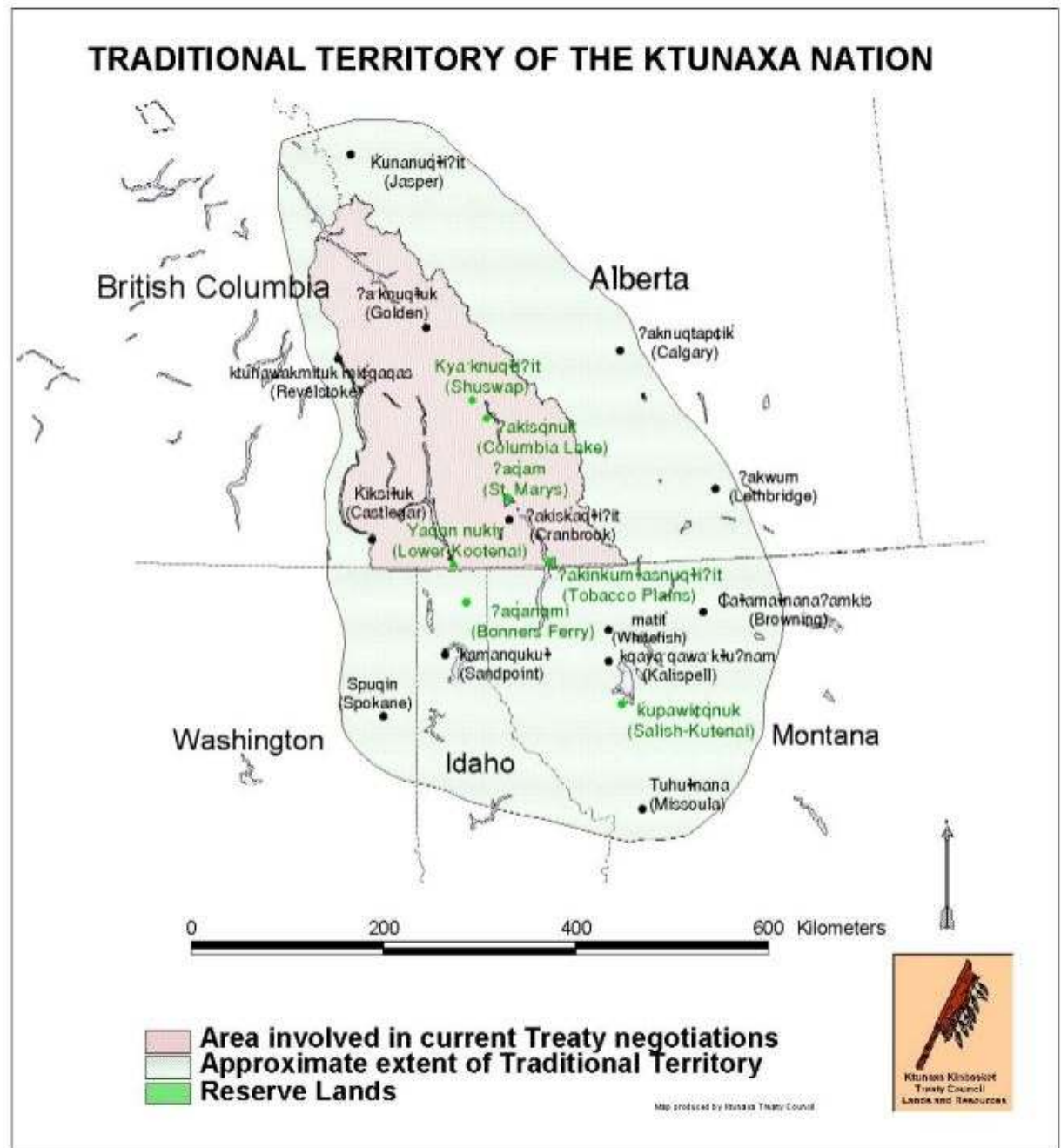
Cultural Sites

Hwy. 95

Idaho



Map by Pacific Northwest
Copyright 1992, 1997



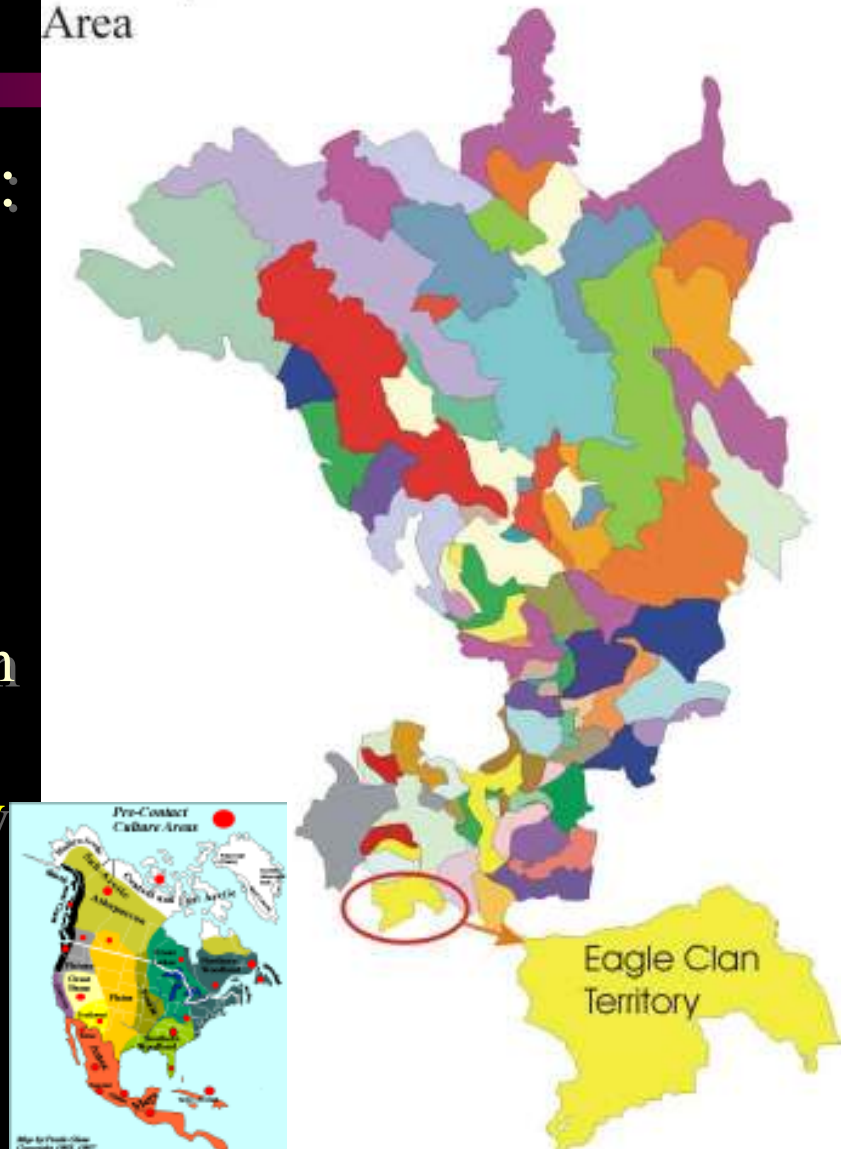
Gitxsan Aboriginal Territory

The Gitxsan Model is a plan for the Landscape and considers:

- Watersheds
- Biodiversity
- Animal migrations patterns
- Critical habitat
- Traditions and Culture of the Gitxsan
- Gitxsan “Clan Houses” generally conform to natural watershed.

Gitxsan First Nation Hazelton, BC, Canada

Location of Eagle Clan Territory within Gitxsan Claim Area



Squamish Aboriginal Territory

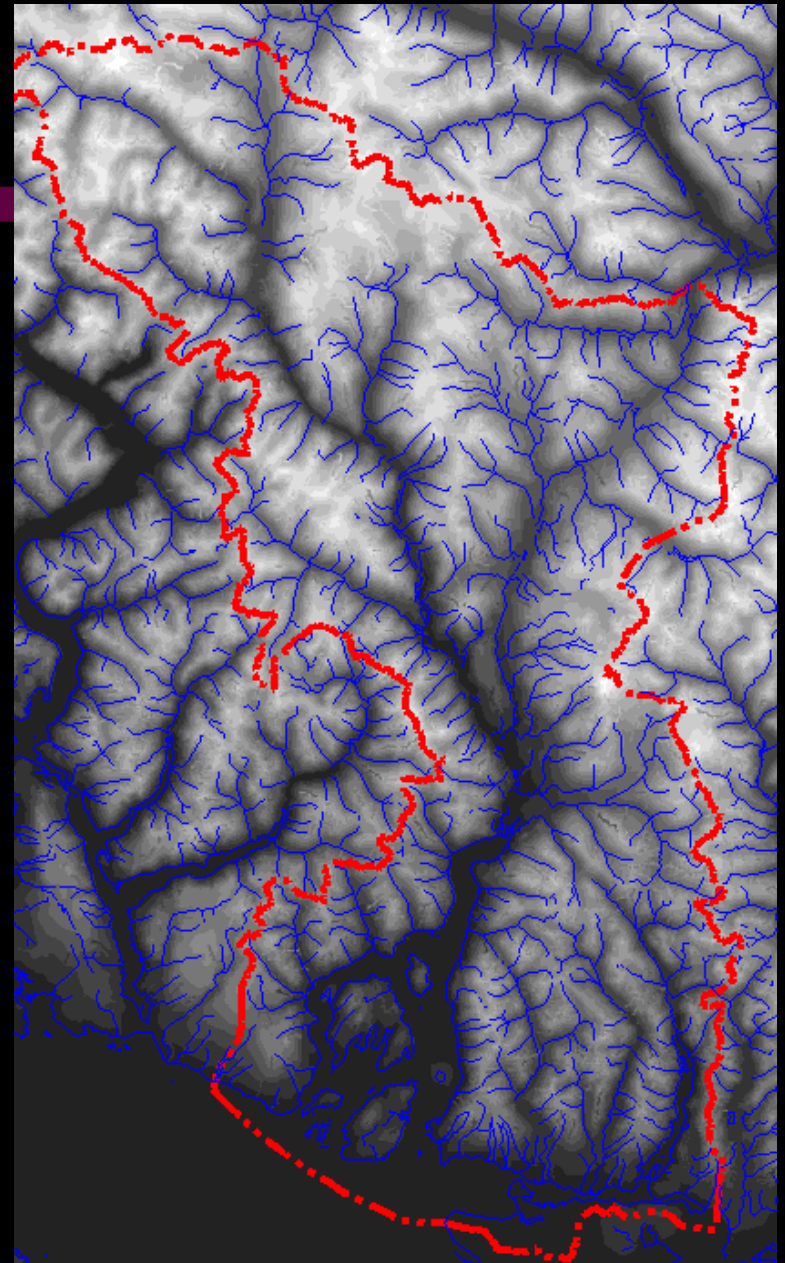
Aboriginal Title established by:

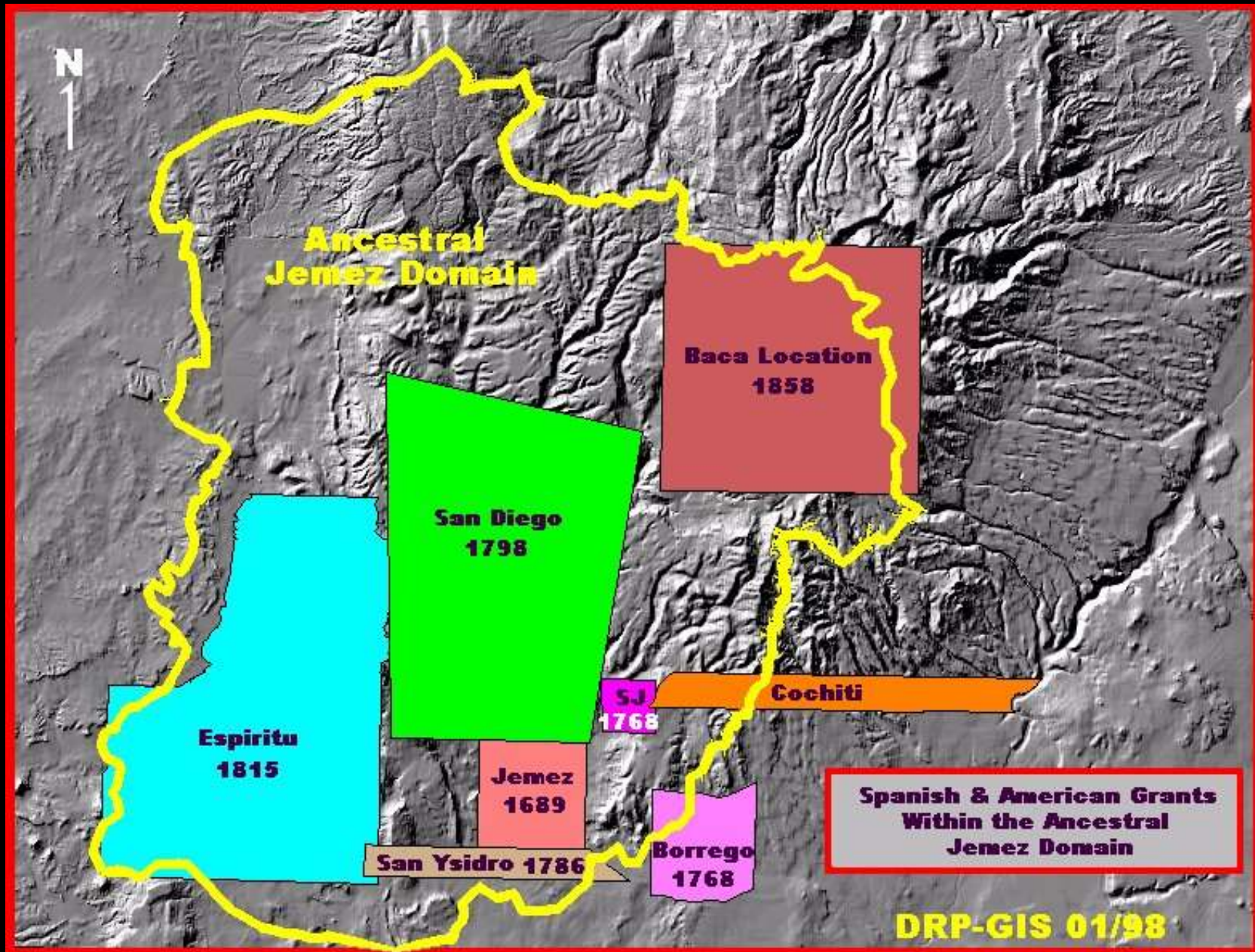
- Archeological Record
- Ethnographic and Historic Research
- Tribal Oral and On-going Traditions

Result:

A map submitted for the Treaty Process that identifies an area of occupancy within the natural boundaries of heights of land and watersheds,

Squamish First Nation, BC Canada



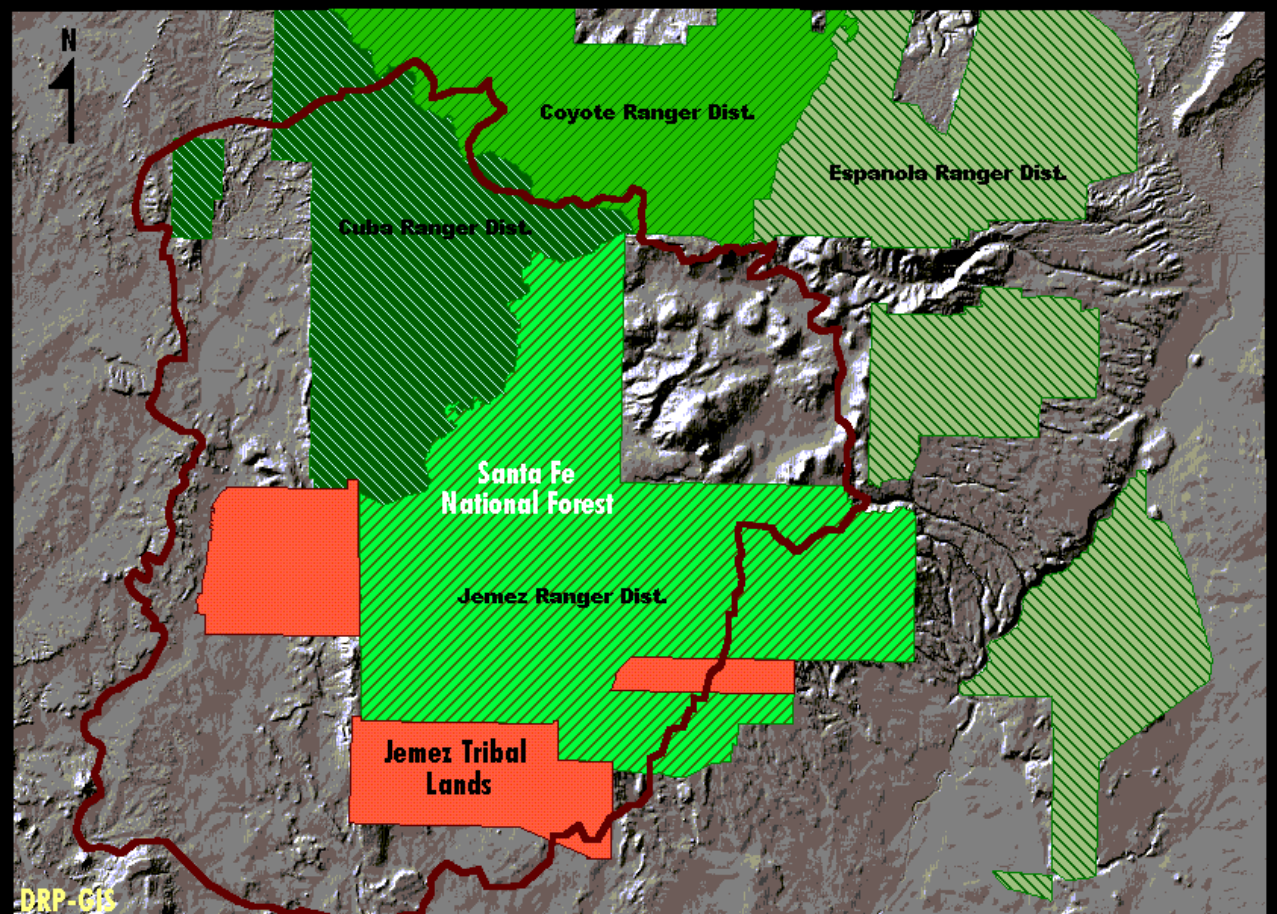


Jemez Pueblo – Aboriginal Lands

Coincident with
Present Land
Tenure

- New Mexico State
- Local Municipalities
- Private Lands
- Sante Fe National Forest

Jemez Ranger
District
Espanola Ranger
District
Cuba Ranger District



Regional Landscapes

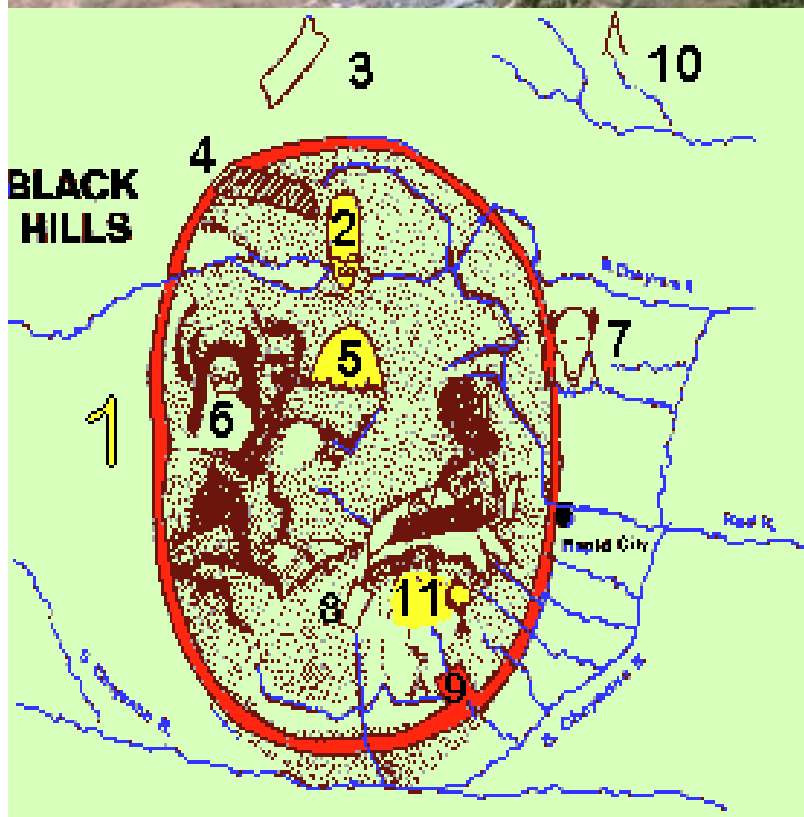


Lakota World View

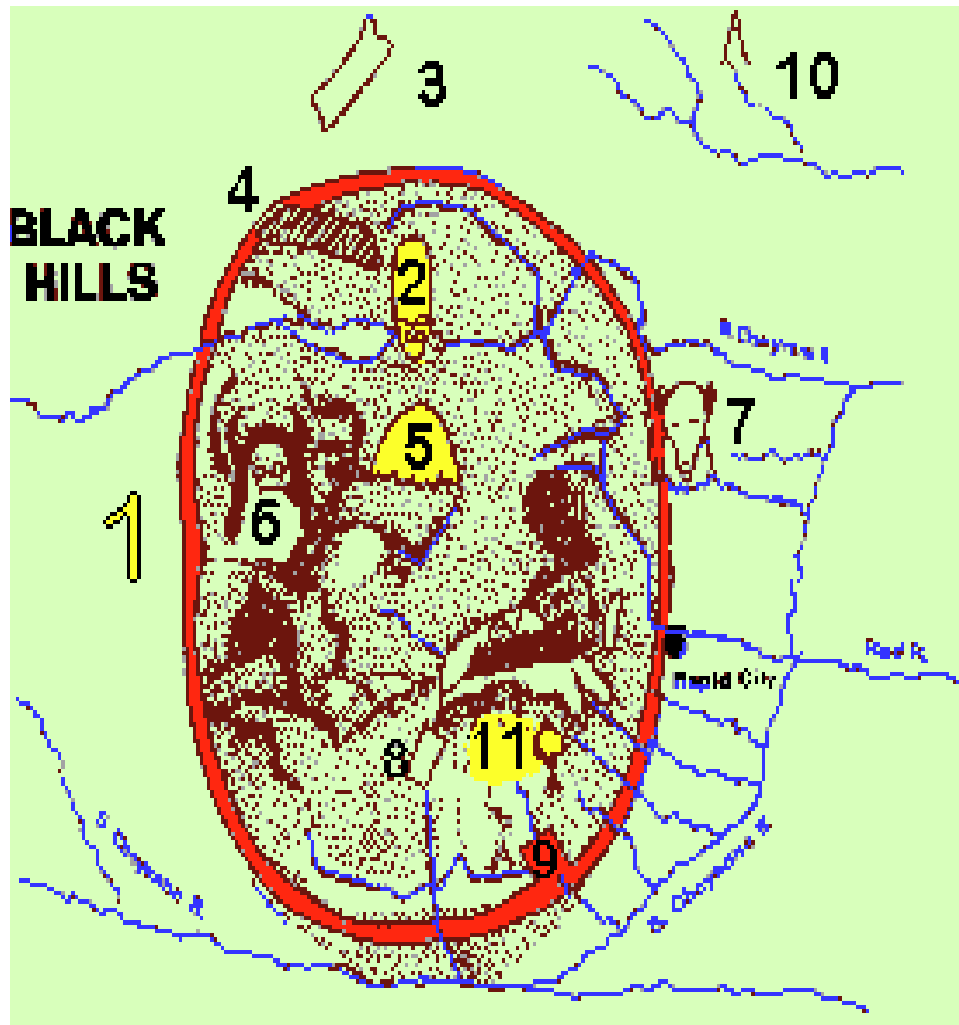
Regional Landscapes and the Lakota World View



A Lakota World View of the Black Hills of South Dakota.



1. Ki yanka o canku (Race Track)
2. Mato Tipi Paha (Devil's Tower)
3. Paha Zipela (Slim Buttes)
4. Paha Sapa (Black Butte)
5. Pe Sla (Old Baldy)
6. Hinhan Kaga Paha (Owl Butte)
7. Mato Paha (Bear Butte)
8. Mni Kata (Hot Springs)
9. Pte Tali Yapa (Buffalo Gap)
10. Wakiyan Paha (Thunder Butte)
11. Harney Peak



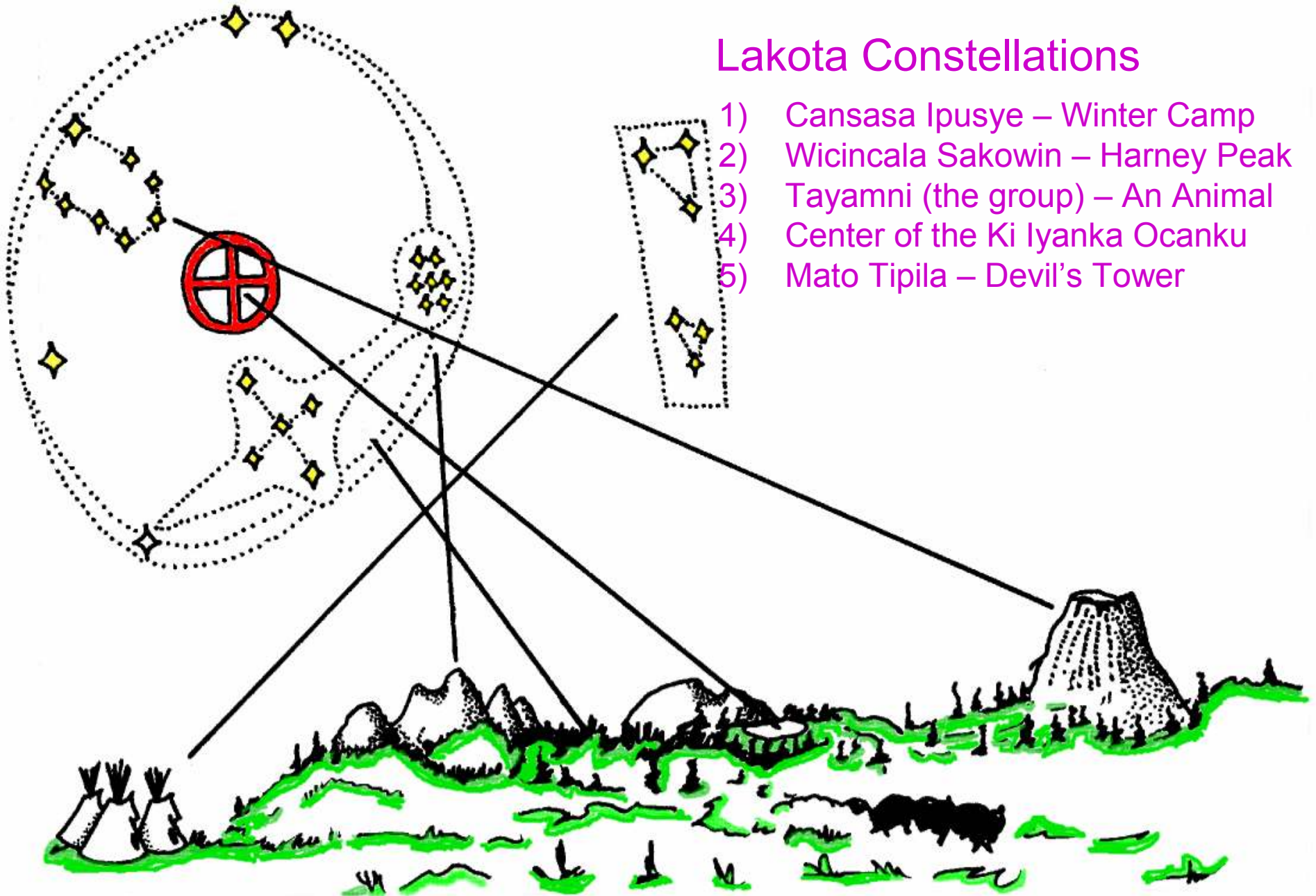
Map by: Amos Bad Heart Bull
Oglala Lakota, Ca. 1890

Photo by: Astronaut John B. Herrington, *Chickasaw*, 2002

Lakota Connections to the Landscape and Beyond

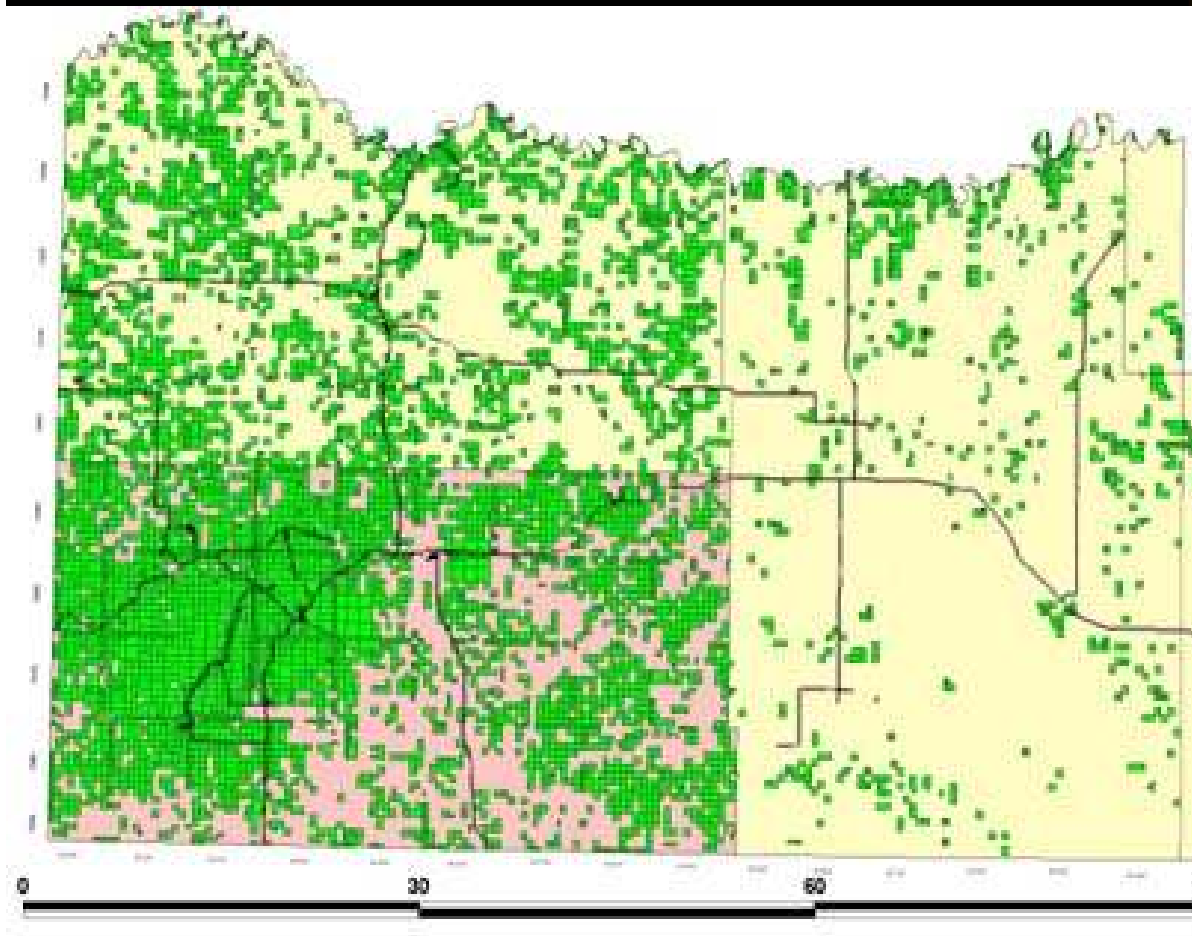
Lakota Constellations

- 1) Cansasa Ipusye – Winter Camp
- 2) Wicincala Sakowin – Harney Peak
- 3) Tayamni (the group) – An Animal
- 4) Center of the Ki Iyanka Ocanku
- 5) Mato Tipila – Devil's Tower





Rosebud Sioux Tribe
Home of the Sicangu Lakota Tetunwan Oyate



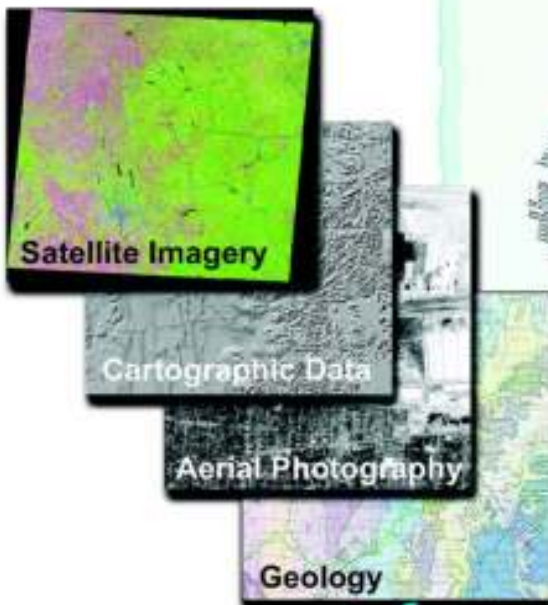
Approximately 890,00 Acres

NATIVEVIEW

- Geo-spatial technology in Indian Country
 - Tribal applications
- Spatial Reasoning
- NativeView
 - History
 - Fundamental Premise
 - Processes
 - Desired Outcomes
 - Strategic objectives
 - Solutions
 - Key Drivers



Indian Lands in the United States



NativeView

33 Native American Tribal Colleges



Applications:

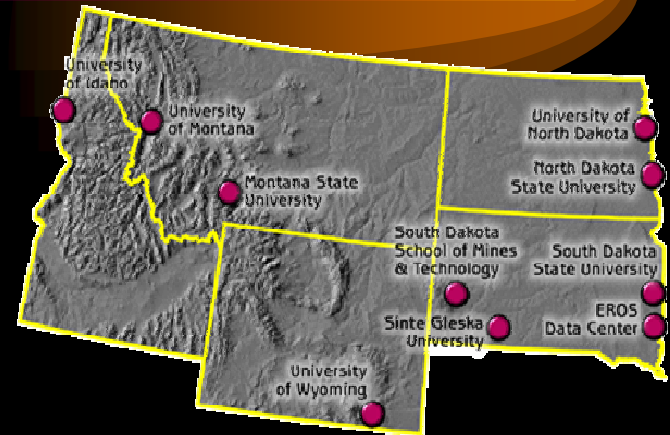
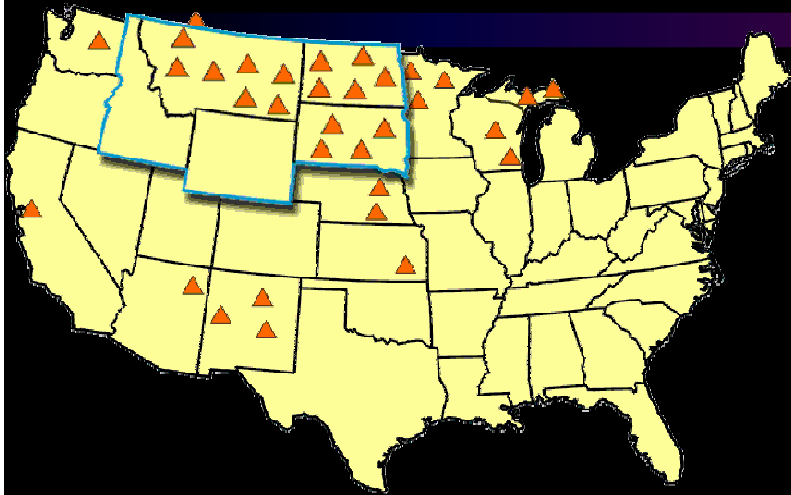
- ✓ Education
- ✓ Community Development
- ✓ Treaty and Trust Responsibility
- ✓ Economic Development
- ✓ Natural Resource Management
- ✓ Cultural Resource Management
- ✓ Disaster Management
- ✓ Collaborative Research

NativeView



⌘ <http://www.sinte.edu/nativeview>

A Consortium of Universities Partnering with Tribal Colleges



George Seielstad

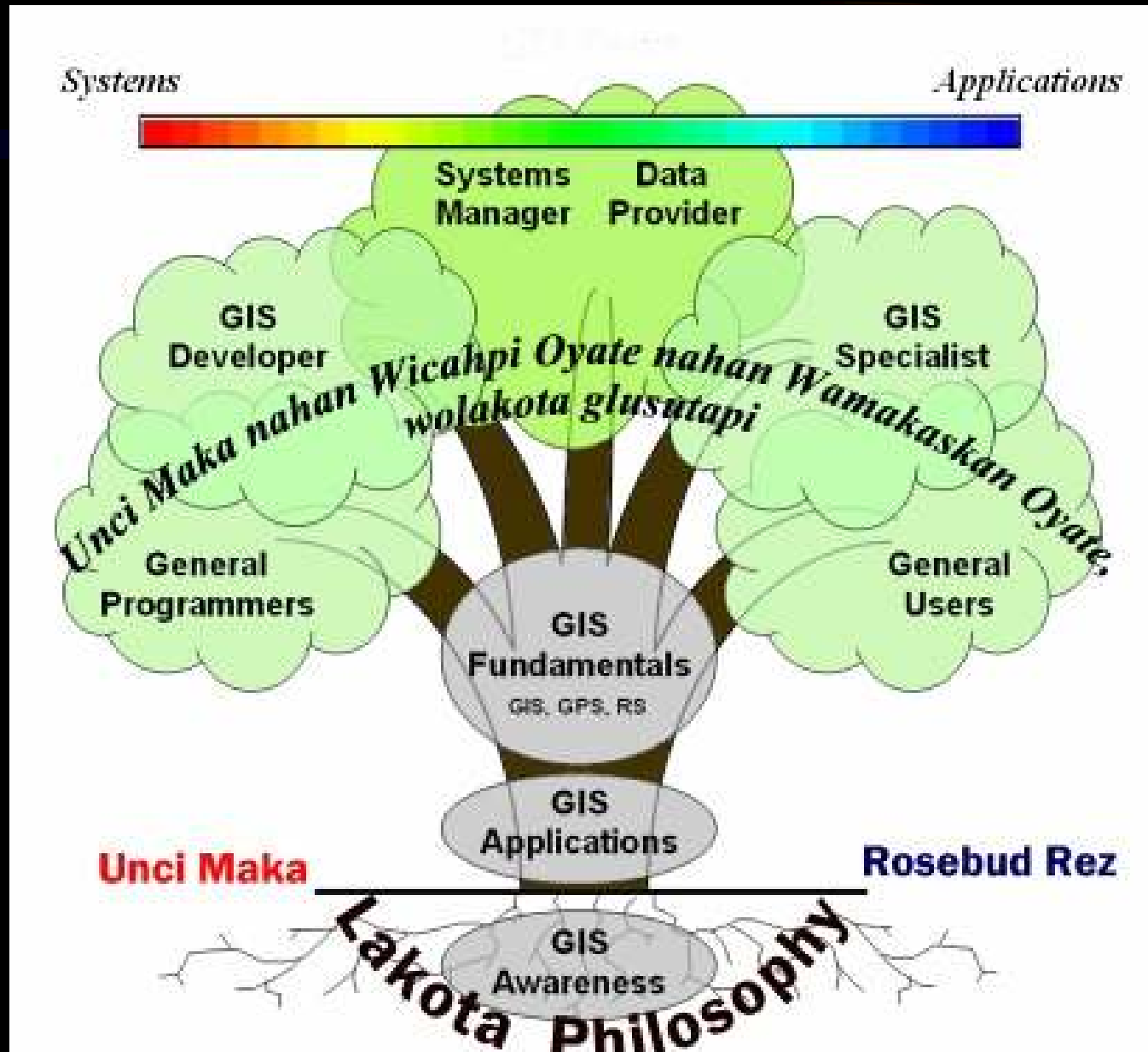
**Associate Dean for Research and Innovative Projects at
the John D. Odegard School of Aerospace Sciences of the
University of North Dakota**

Spatial Reasoning:



- Along this path, many changes in mapping will be found new applications.
- Effective Education and Communication with the growing world of map users becomes the catalyst for transformation.

Spatial Reasoning: Lakota-style



Traditional Ecological Knowledge and Earth Science Application



BISON Restoration Project

Assessment

- Historical Mapping
- Community Research
- Knowledge-Building
- Knowledge Transition
- Information Data Base

= Community-Based
Research on the State of
Environmental Systems

Education

- Weather & Society
- Earth's Climate System
- Ethno-Botany
- Soil Science
- Animal Science
- Prairie Ecology
- History of Bison

= Community Education
= Structured courses
+ lifelong learning classes
+ application workshops
+ university outreach

Research

Compare / Contrast
Bison & Cattle

Developing
Scenarios

- Soil Erosions
- Water Quality
- Vegetation Trends
- Climatologic Trends

= Community Risk
Assessment &
Corrective Action Plans

ENTERPRISE GIS

Use community-based
research to build tribal
Geo-spatial
Environmental systems

K-16 Great Plains
Ecosystem educational
Curriculum

Use collaborative action
research to develop risk
assessment models
associated with prairie
ecosystems and
climatology

Infuse GIS into Tribal
Decision Making
process

Rez Mapper

A Geo-spatial/temporal Information System with a Vision:

An ability to integrate, view and apply
USGS Topo Maps, Satellite Imagery,
Aerial Photographs, Digital Ortho Quads
with Lakota Data

for:

Lakota Cultural Resource Management
Reservation Land Use Determination
Community Growth and planning

*"Unci Maka nahan Wichapi Oyate nahan Wamakaskan Oyate
wolakota glusutapi."*



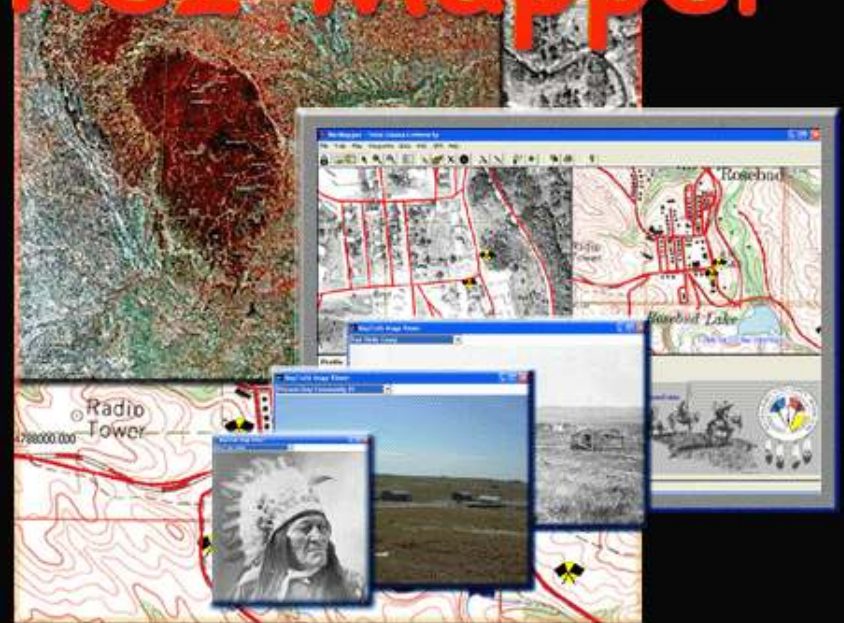
jamesrl@sinte.edu or www.spatialdatatech.com

NASA/Black Hills from Space 2003

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Rez Mapper

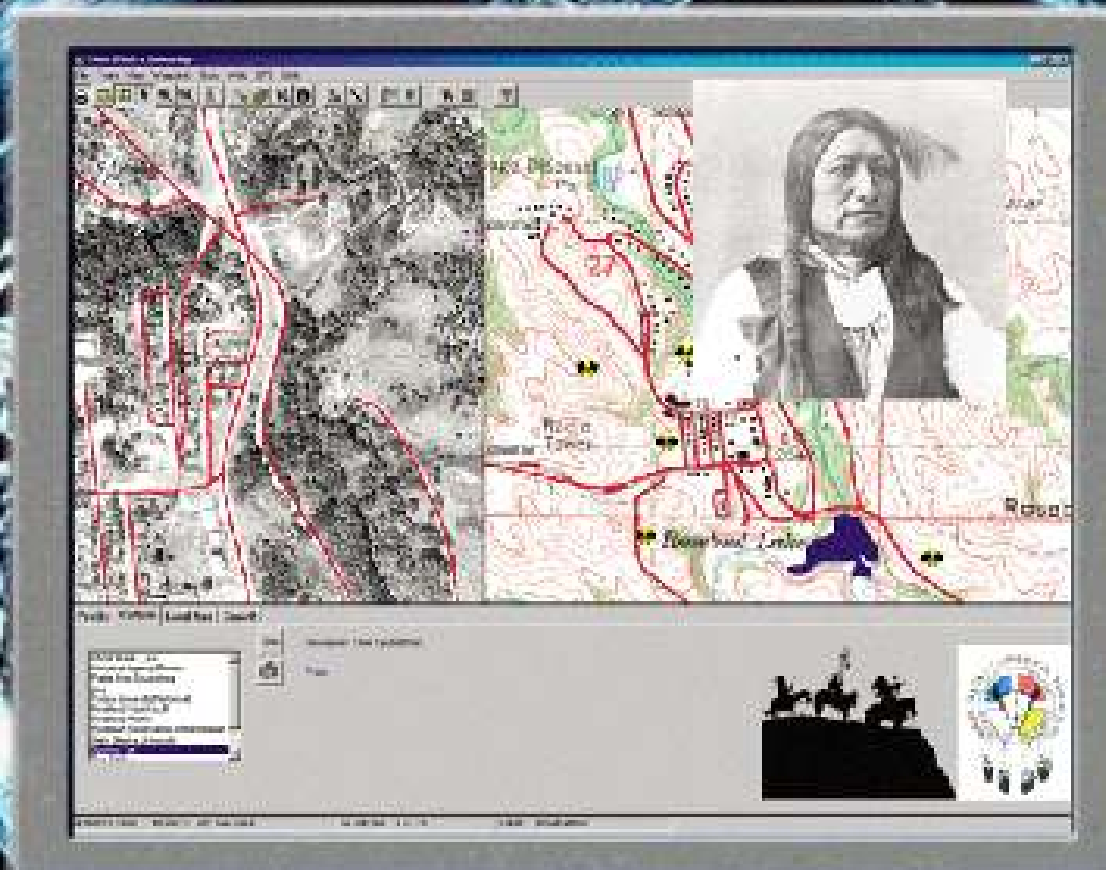


Interactive Community Mapping Program
for the Rosebud Lakota Nation

*"Unci Maka nahan Wichapi Oyate nahan Wamakaskan Oyate
wolakota glusutapi."*

Sinte Gleska University, Sicangu Policy Institute

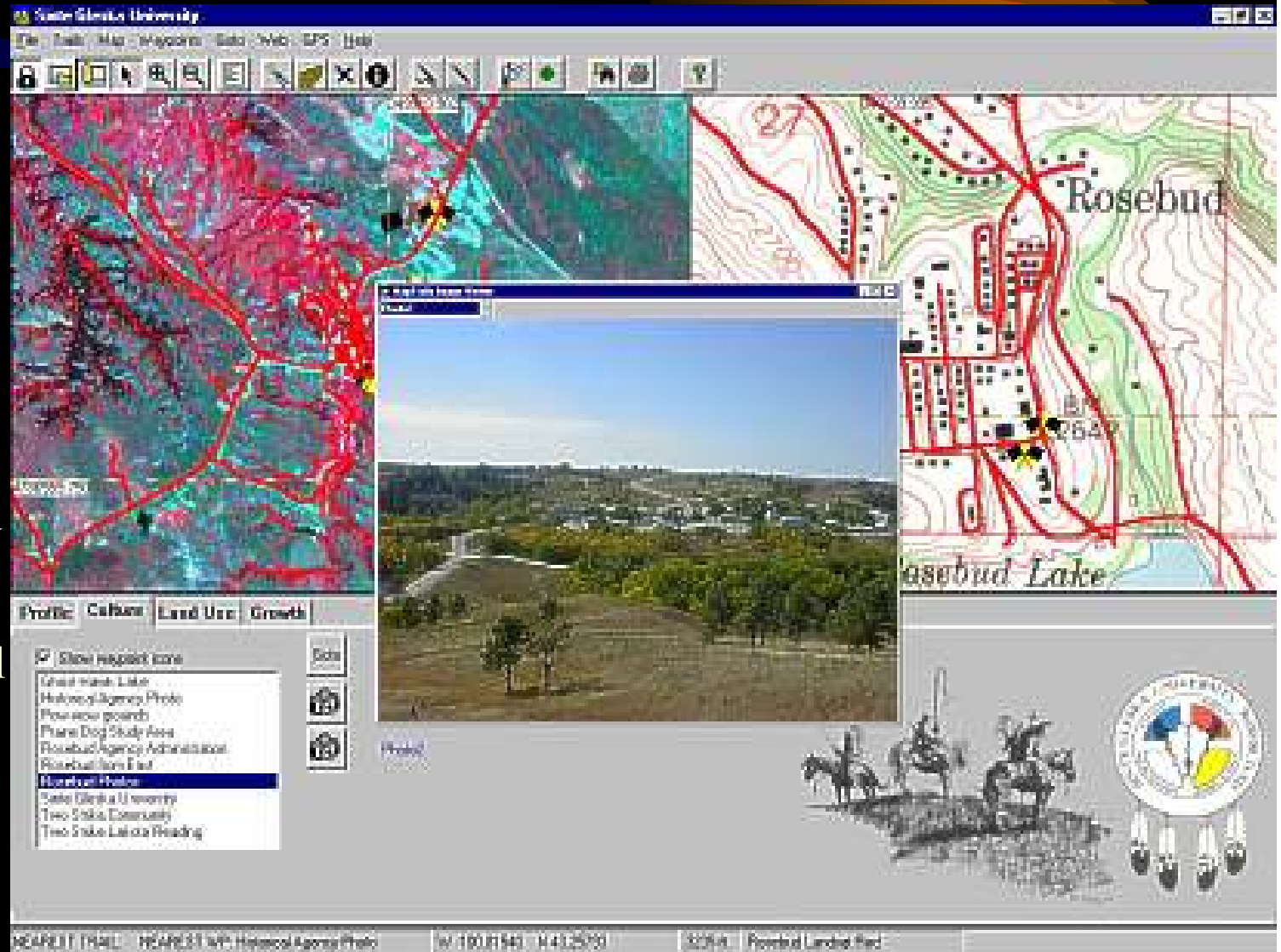
Demonstration Interactive Mapping and Data Project



Sinte Gleska University, Sincangu Policy Institute

Spatial Reasoning:

Within this context, GIS evolves from the traditional role of automated cartography, thematic mapping and geo-querying to an integrated part of how we address complex spatial issues.



GIS Is Providing A New Language Encompassing Many Opportunities

- for...*
- Advancing Science
 - Designing With Nature
 - Making Communities Livable
 - Increasing Efficiency
 - Supporting Economic Development
 - Improving Human Health
 - Mitigating Conflicts

**... Especially Well Suited for Imagining Our Future
... In Fact it is Essential**



*Native GIS Application
cir. 1890*

Contact Information



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